AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): A digital signal processing (DSP) receiver for analyzing an optical signal comprising:

a receiver input for receiving the optical signal;

at least two photo diodes,

at least two analog-to-digital conversion (ADC) unit; and

a DSP processing unit;

a splitting unit splitting the optical signal received by the receiver input into a number of parts such that said number corresponds to a number of diodes in the receiver; and

at least two waveguide branches,

wherein the split parts of the optical signal are fed into said at least two waveguide branches such that the entire optical signal is fed into the at least two waveguide branches,

wherein each waveguide branch comprises a different optical filtering element,

wherein each waveguide branch is fed onto a separate photo diode of the at least two photo diodes,

wherein the signal of each photo diode is fed into a separate ADC unit of the at least two analog-to-digital conversion unit,

wherein the signal of each ADC unit is fed into the DSP processing unit, and

wherein different types of filtering process are executed in each waveguide branch.

2. (cancelled).

3. (previously presented): The DSP receiver according to claim 1, wherein the optical filtering element(s) comprise at least one of chromatic dispersion elements, polarization filters, and spectral filters.

4. (previously presented): The DSP receiver according to claim 1, wherein the DSP processing unit comprises at least one of an application specific integrated circuit and a field programmable gate array circuit.

5. (previously presented): The DSP receiver according to claim 1, wherein an additional optical filtering element is arranged between the receiver input and the splitting unit.

6. (previously presented): A method for recovering an optical signal with a digital signal processing receiver, the method comprising:

splitting the optical signal into a number parts such that said number corresponds to a number of diodes in the receiver and providing the signal parts to a respective branch of at least two branches such that the entire optical signal is fed into the at least two waveguide branches;

filtering each split optical signal;

detecting and converting the split optical signals into split digital signals; and

analyzing the split digital signals in order to recover information of the optical signal,

wherein different types of filtering process are executed in each waveguide branch.

7. (previously presented): The method according to claim 6, wherein the information is a recovered electrical data signal modulated onto the optical signal.

8. (previously presented): The method according to claim 6, wherein the information is likelihood numbers for the probability of 0 and 1 bits carried by the optical signal.

9. (previously presented): The method according to claim 8, wherein the analysis of the split optical signals uses a MAP algorithm.

10. (previously presented): A computer readable medium storing instructions for performing a method of recovering an optical signal with a digital signal processing receiver, the instructions comprising:

instructions for splitting the optical signal into a number of parts such that said number corresponds to a number of diodes in the receiver and providing the signal parts to a respective branch of at least two branches such that the entire optical signal is fed into the at least two waveguide branches;

instructions for filtering each one split optical signal;

instructions for detecting and converting the split optical signals into split digital signals; and

instructions for analyzing the split digital signals in order to recover information of the optical signal,

wherein different types of filtering processes are executed in each waveguide branch.

11. (previously presented): A digital signal processing (DSP) receiver for analyzing an optical signal comprising:

a receiver input for receiving the optical signal;

at least two photo diodes,

at least two analog-to-digital conversion (ADC) units; and

a DSP processing unit;

a splitting unit splitting the optical signal received by the receiver input; and

at least two waveguide branches,

wherein:

the split parts of the optical signal are fed into said at least two waveguide branches,

at least one waveguide branch comprises an optical filtering element,

each waveguide branch is fed onto a separate photo diode of said at least two photo diodes,

the signal of each photo diode is fed into a separate ADC unit of the at least two ADC units,

the signal of each ADC unit is fed into the DSP processing unit, and

filtering process is executed in at least one waveguide branch or one waveguide branch does not have the optical filter element and the other one of the at least two waveguide branches comprises the optical filter element,

the at least two waveguide branches comprise a first waveguide branch and a second waveguide branch,

the split parts of the optical signal comprises a first split part transmitted in the first waveguide branch and a second split part transmitted in the second waveguide branch,

the first waveguide branch does not have the optical filtering element and the DSP processing unit analyzes the first split part for intensity information of the whole optical signal, and

the second waveguide branch comprises the optical filtering element and the DSP processing unit analyzes the second split part for information specific to only the second split part of the optical signal.

12. (previously presented): The DSP receiver according to claim 1, wherein:

the at least two waveguide branches comprise a first waveguide branch and a second waveguide branch,

the split parts of the optical signal comprises a first split part transmitted in the first waveguide branch and a second split part transmitted in the second waveguide branch,

the optical filtering element comprises a first type of filtering element and a second type of filtering element,

the first waveguide branch comprises the first type of filtering element,

the second waveguide branch comprises the second type of filtering element,

wherein the first type of filtering element performs a filter processing different from the second type of filtering element.

13. (previously presented): The DSP receiver according to claim 12, wherein the first type of filtering element and the second type of filtering element comprise at least two of: a chromatic dispersion element, a polarization filter, and a spectral filter.

14. (previously presented): The DSP receiver according to claim 1, wherein the DSP receiver is provided in a terabit optical network.

15. (previously presented): A digital signal processing (DSP) receiver for analyzing an optical signal comprising:

a receiver input which receives the optical signal;

at least two photo diodes,

at least two analog-to-digital conversion (ADC) units; and

a DSP processing unit;

a splitting unit which splits the optical signal received by the receiver input; and

at least two waveguide branches,

wherein the split parts of the optical signal are fed into said at least two waveguide branches,

wherein at least one waveguide branch comprises an optical filtering element,

wherein each waveguide branch is fed onto a separate single photo diode of the at least two diodes,

wherein the signal of each photo diode is fed into a separate ADC unit of the at least two ADC units,

wherein the signal of each ADC unit is fed into the DSP processing unit, and

wherein the DSP processing unit is configured to correlate information of all waveguide branches to determine one of most likely transmitted bit pattern of the optical signal and numbers for the probability of 0 and 1 in the transmitted bit pattern of the optical signal.

16. (previously presented): The DSP receiver according to claim 15, wherein each waveguide branch comprises a different optical filtering element.

17. (previously presented): The DSP receiver according to claim 15, wherein the optical filtering element(s) comprise at least one of chromatic dispersion elements, polarization filters, and spectral filters.

18. (previously presented): The DSP receiver according to claim 15, wherein the DSP processing unit comprises at least one of an application specific integrated circuit and a field programmable gate array circuit.

19. (previously presented): The DSP receiver according to claim 15, wherein an additional optical filtering element is arranged between the receiver input and the splitting unit.

20. (previously presented): A method for recovering an optical signal with a digital signal processing receiver, the method comprising:

splitting the optical signal into parts and providing the signal parts to a respective branch of at least two branches;

filtering at least one split optical signal;

detecting and converting the split optical signals into corresponding same number of split digital signals; and

analyzing the split digital signals in order to recover information of the optical signal,

wherein said analyzing comprises correlating information of all waveguide branches to determine one of most likely transmitted bit pattern of the optical signal and numbers for the probability of 0 and 1 in the transmitted bit pattern of the optical signal.

21. (currently amended): The DSP of claim 11, wherein the optical filtering elements(s) comprise at least one of chromatic dispersion elements, polarization filters ~~filers~~, and spectral filers.

22. (currently amended): The DSP of claim 11, wherein the DSP processing unit analyzes ~~only the first split part for intensity information of the whole optical signal and the DSP processing unit analyzes only~~ the second split part for information specific to only the second

split part of the optical signal and wherein the optical filtering elements(s) comprise at least one of chromatic dispersion elements and polarization filters.

23. (previously presented): The DSP receiver according to claim 1, wherein each portion of the signal is provided to one of the at least two waveguide branches, each of which includes a different type of filtering.

24. (previously presented): The DSP receiver according to claim 1, wherein the different optical filtering element comprises at least two polarization filters with orthogonal orientation.

25. (previously presented): The DSP receiver according to claim 1, wherein the different optical filtering element comprises at least two spectral filters with different transmission intervals.

26. (previously presented): The DSP receiver according to claim 1, wherein a first waveguide branch of the at least two waveguide branches comprises a first optical filtering element with a first type of filtering process and wherein a second waveguide branch of the at least two waveguide branches comprises a second optical filtering element with a second type of filtering process, wherein the first type of filtering process is different from the second type of filtering process.

27. (previously presented): The DSP receiver according to claim 1, wherein each waveguide branch is fed onto the separate, single photo diode and wherein the respective optical filtering element has a single output signal.

28. (new): The DSP receiver according to claim 26, wherein types of filtering elements comprise: a chromatic dispersion filtering, a polarization filtering, and spectral filtering and wherein the second optical filtering element comprises different filtering type from the first optical filtering element.

29. (new): The DSP receiver according to claim 1, wherein at least one of the two branches comprises two different types of filtering elements and wherein the two different types of filtering elements are different from the filter elements on the other branch.